



# UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE  
United States Patent and Trademark Office  
Address: COMMISSIONER FOR PATENTS  
P.O. Box 1450  
Alexandria, Virginia 22313-1450  
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/689,207	10/20/2003	Huai-Rong Shao	MERL-1502	4453

22199 7590 11/09/2007  
MITSUBISHI ELECTRIC RESEARCH LABORATORIES, INC.  
201 BROADWAY  
8TH FLOOR  
CAMBRIDGE, MA 02139

EXAMINER
----------

DUONG, CHRISTINE T

ART UNIT	PAPER NUMBER
----------	--------------

2616

MAIL DATE	DELIVERY MODE
-----------	---------------

11/09/2007

PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

## Office Action Summary

Application No.

10/689,207

Applicant(s)

SHAO ET AL.

Examiner

Christine Duong

Art Unit

2616

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 10 September 2007.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-11 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-4, 6, 7, 10 and 11 is/are rejected.
- 7) ☒ Claim(s) 5, 8 and 9 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- ☐ Notice of References Cited (PTO-892)
- ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- ☐ Information Disclosure Statement(s) (PTO/SB/08)  
Paper No(s)/Mail Date \_\_\_\_\_
- ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_
- ☐ Notice of Informal Patent Application
- ☐ Other: \_\_\_\_\_

## DETAILED ACTION

### *Response to Amendment*

This is in response to the Applicant's arguments and amendments filed on 10 September 2007 in which claims 1-11 are currently pending.

### ***Claim Rejections - 35 USC § 102***

1. **Claims 1-2, 4, 7 and 10-11** are rejected under 35 U.S.C. 102(e) as being anticipated by Varadarajan et al. (PG Pub US 2004/0255323 A1).

Regarding **Claim 1**, Varadarajan et al. discloses a method for selecting multiple paths between a server **(the following elements alone or in combination of video server 104 and edge node 108, Fig. 1)** and a client **(video client 102, Fig. 1)** in an overlay network **(streaming overlay network 114, Fig. 1)** having a plurality of nodes connected by links **(“Each node, edge or core, has one or more links and these links interconnect the nodes of the SON”, [0050] Lines 2-4)**, the plurality of nodes including the server and the client **(video server 104, source edge node 108, core node 110, video client 102, etc., Fig. 1)**, each path including a set of selected links, comprising:

measuring, in each node, quality of service metrics of each link directly connecting the node to an immediate neighboring node **(“Each node monitors the health of the associated links”, [0050] Lines 20-21);**

transmitting the metrics to the server **(“each node ... communicates any change in BW availability to edge nodes by multicasting”, [0050] Lines 23-25);**

maintaining, in the server, the metrics, a link correlation matrix (**“Connectivity/Available bandwidth Matrix 408 contains the most recent information related to the bandwidth availability between any two neighboring nodes”, [0045] and Fig. 4)** based on the metrics, and a path correlation matrix (**“BW Table 410 provides a node-wise consolidated information regarding total and available bandwidth”, [0045] and Fig. 4)** based on the link correlation matrix (**“Connectivity/Available Bandwidth Matrix (ABW), maintained by each edge node, contains the available bandwidth between a pair nodes that are directly connected via a link” and “the load on the SON is directly controlled by the edge nodes of the SON and these edge nodes keep track of the status of each of the core nodes such as available bandwidth and available cache space. Entire traffic through the SON is controlled by these edge nodes (812)”, [0050]); and**

selecting the multiple paths based only on the metrics, the link correlation matrix, and the path correlation matrix (**“the route determination involves identifying a best possible sub-path from a given node towards the target edge node with as much bandwidth as possible”, [0053] and Fig. 11).**

Regarding **Claim 2**, Varadarajan et al. discloses everything claimed as applied above (see *Claim 1*). In addition, streaming data from the server to the client via the multiple paths (**“stream a video from a server to a client”, [0036] Line 1 and “the route determination involves identifying a best possible sub-path from a given node towards the target edge node with as much bandwidth as possible”, [0053] Lines 2-5).**

Regarding **Claim 4**, Varadarajan et al. discloses everything claimed as applied above (see *Claim 2*). In addition, the streaming data are multimedia ("**stream a video from a server to a client**", [0036] Line 1).

Regarding **Claim 7**, Varadarajan et al. discloses everything claimed as applied above (see *Claim 1*). In addition, the measuring, transmitting, maintaining, and selecting are performed dynamically and periodically over a time window ("**the available bandwidth is dependent on status of links and nodes, and this status needs to be tracked continuously to maintain an accurate estimate of the available bandwidth**", [0050] Lines 17-20).

Regarding **Claim 10**, Varadarajan et al. discloses everything claimed as applied above (see *Claim 1*). In addition, Varadarajan et al. discloses the link correlation matrix relates each link to all other links based on the metrics ("**Connectivity/Available Bandwidth Matrix. This table contains the most recent information related to the bandwidth availability between any two neighboring nodes**", [0045] and Fig. 4).

Regarding **Claim 11**, Varadarajan et al. discloses everything claimed as applied above (see *Claim 1*). the path correlation matrix relates each possible path to all other possible paths ("**410 describes BW Table that provides a node-wise consolidated information regarding total and available bandwidth**", [0045] and Fig. 4).

***Claim Rejections - 35 USC § 103***

2. **Claim 3** is rejected under 35 U.S.C. 103(a) as being unpatentable over Varadarajan et al. further in view of Menon et al. (PG Pub US 2002/0152318 A1).

Regarding **Claim 3**, Varadarajan et al. discloses everything claimed as applied above (see *Claim 1*). However, Varadarajan et al. fails to specifically disclose that storing a copy of the data only at the server, as claimed.

Nevertheless, Menon et al. teaches **“content such as an audio or video object is stored on a single object server only” (Menon et al.: [0009])**.

Therefore, it would have been obvious to a person having ordinary skill in the art at the time the invention was made to modify Varadarajan et al.'s system to only store a copy of the video at the server because of better **“content delivery network architectures and operational schemes” (Menon et al.: [0008])**.

3. **Claim 6** is rejected under 35 U.S.C. 103(a) as being unpatentable over Varadarajan et al. further in view of Klinker et al. (PG Pub US 2003/0088671 A1).

Regarding **Claim 6**, Varadarajan et al. discloses everything claimed as applied above (see *Claim 1*). Additionally, Varadarajan et al. discloses that the metrics include bandwidth (**Connectivity Matrix/ABW Matrix 408 and BW Table 410, Fig. 4**), latency (**Expected End Time in Video Streams 404, Fig. 4**). However, Varadarajan et al. fails to specifically disclose that the metrics include packet loss rate of the link, as claimed.

Nevertheless, Klinker et al. teaches **“a rule can set: ... the maximum load or bandwidth usage associated with traffic flows through specific providers; ... the maximum acceptable latency or loss over one or more paths across multiple network service providers ... Flow control system 90 further operates to detect when one or more rules, or flow policies, are violated and then to take remedial action” (Klinker et al.: [0055-0056])**.

Therefore, it would have been obvious to a person having ordinary skill in the art at the time the invention was made to modify Varadarajan et al.'s metrics to include bandwidth, latency and loss because it will allow **"Internet customers to manage the bandwidth across multiple providers in terms of at least cost, bandwidth, performance (in terms of packet loss, latency and jitter), etc."** (Klinker et al.: [0013]).

#### ***Allowable Subject Matter***

4. **Claims 5, 8 and 9** are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims:

#### ***Response to Arguments***

Previous objection to the specification and minor informality objection to claim 3 have been withdrawn in view of Applicant's amendment.

Previous 35 USC 102(e) rejection anticipated by Perkins et al. to claim 1 has been withdrawn in view of Applicant's amendment.

5. Applicant's arguments regarding claims 1, 3, 6-7 have been fully considered but they are not persuasive.

In response to Applicant's argument regarding claim 1 that Varadarajan's client and server are outside the overlay network, it has been interpreted that the video server, video client and Internet are part of the streaming overlay network. In addition, Varadarajan discloses in fig. 2 "a network architecture related to PWVS system. The architecture depicts multiple video clients (202) connected to multiple video servers

(204) through an IP network Such as Internet/intranet (206). In a typical video service, this is all could be the infrastructure. However, to overcome the various challenges and bottlenecks due to network and host congestion, a streaming overlay network is introduced as part of the PWVS network architecture (210). SON contains multiple edge nodes (212) and multiple core nodes (214)" ([0042] lines 1-10). Therefore, the client and server in Varadarajan are part the overlay network.

In response to Applicant's argument regarding claim 1 that Varadarajan's core and edge nodes measure QoS, it has been interpreted that, as described above, the client and server are part of the overlay network. Additionally, since the client and server are part of the streaming overlay network, it has been interpreted that the video server and edge node could be one entity that would read on Applicants' server and similarly, the video client and edge node could be one entity that would read on Applicants' client. Therefore, since Varadarajan's core and edge nodes measure QoS, the combined entities will also measure QoS. In addition, Varadarajan discloses "Video on demand as a service needs adequate infrastructure (network and servers) to meet Quality of Service (QoS) requirements. Relevant QoS parameters are time to start of the video and sustainable frame rate. Both these parameters are affected when a server that is to stream a video to a client and a network through which the server and the client are connected are loaded" ([0002] lines 1-7). It would be necessary to also have QoS information in the client and server as well.

In response to Applicant's argument regarding claim 1 that Varadarajan's QoS metrics are communicated to the edge nodes, maintained by the edge nodes, and the



edge nodes select the paths, it has been interpreted, as described above, that since the Varadarajan's server is part of the streaming overlay network, the video server and edge node could be one entity that would read on Applicants' server. Therefore, the combined entities receive and maintain QoS metrics and perform the path selection.

In response to Applicant's argument regarding claim 7 that Varadarajan's status is maintained continuously, it is understood that the continuous tracking is a periodic process with time window. In addition, the claimed subject matter does not specify the "time window". In accordance with MPEP, "USPTO personnel are to give claims their broadest reasonable interpretation in light of the supporting disclosure. In re Morris, 127 F.3d 1048, 1054-55, 44 USPQ2d 1023, 1027-28 (Fed. Cir. 1997). Limitations appearing in the specification but not recited in the claim should not be read into the claim. E-Pass Techs., Inc. v. 3Com Corp., 343 F.3d 1364, 1369, 67 USPQ2d 1947, 1950 (Fed. Cir. 2003) (claims must be interpreted "in view of the specification" without importing limitations from the specification into the claims unnecessarily). In re Prater, 415 F.2d 1393, 1404-05, 162 USPQ 541, 550-551 (CCPA 1969). See also In re Zletz, 893 F.2d 319, 321-22, 13 USPQ2d 1320, 1322 (Fed. Cir. 1989)" (MPEP2106). Therefore, the continuous tracking in the Varadarajan reads on the claimed "measuring, transmitting, maintaining and selecting being performed dynamically and periodically over a time window".

In response to Applicant's argument regarding claim 3 that Varadarajan describes the video cache is in the core and edge nodes, it has been interpreted, as described above, that since the Varadarajan's server is part of the streaming overlay

network, the video server and edge node could be one entity that would read on Applicants' server. Therefore, the combined entities store a copy of the streaming data. Although Varadarajan does not specifically disclose that the streaming data is only stored at the combined entities that represent the server in the overlay network, Menon et al. discloses "a video object is stored on a single object server only" (Menon et al. [0009]) and a combination of Menon et al.'s video object being stored in the server only with Varadarajan's combined entities that represent the server in the overlay network would read on the claimed "storing a copy of the streaming data only at the server" with a motivation that it will produce better "content delivery network architectures and operational schemes" (Menon et al. [0008]).

In response to Applicant's argument regarding claim 6 that Klinker does not describe measuring metrics including bandwidth, latency, and packet loss rate of the link, it has been explained that Varadarajan discloses measuring the bandwidth and latency in the Connectivity Matrix/ABW Matrix and BW Table and with the Expected End Time in Video Streams. In addition, Klinker discloses that "flow control system 90 operates to measure end-to-end (i.e., source to destination and destination to source) data traffic 95 in terms of flow characteristics, such as performance, cost, bandwidth, and the like" (Klinker [0052]) and furthermore "flow control system 90 further functions to compare specific data traffic flows (i.e., both uni- and bi-directional traffic flows outbound from and inbound into the data network) to determine whether a particular traffic flow meets one or more rules of an associated flow policy. A flow policy, as referred to herein, includes a set of one or more rules that is associated with a particular

data traffic flow related to particular system user" (Klinker [0054]) and that "a rule can set: ... the maximum load or bandwidth usage associated with traffic flows through specific providers; ... the maximum acceptable latency or loss over one or more paths across multiple network service providers; ... and any other data flow characteristic that can influence the measurement or the control of data traffic" (Klinker [0055]). Therefore, a measurement would be needed in order to make a detection of violated rules and so a combination of Klinker's metrics including bandwidth, latency, and loss over one or more paths with Varadarajan's combined entities that represent the overlay network would read on the claimed "metrics including bandwidth, latency, and packet loss rate of the link" with a motivation that it will allow "Internet customers to manage the bandwidth across multiple providers in terms of at least cost, bandwidth, performance (in terms of packet loss, latency and jitter), etc." (Klinker [0013]).

### ***Conclusion***

**6. THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of

Art Unit: 2616

the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Christine Duong whose telephone number is (571) 270-1664. The examiner can normally be reached on Monday - Friday: 830 AM-6 PM EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Seema Rao can be reached on (571) 272-3174. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

CTD 11/01/2007 CTD

KWANG BIN YAO  
SUPERVISORY PATENT EXAMINER

A handwritten signature in black ink, appearing to read 'Kwong Bin Yao', is written over the printed name and title of the Supervisory Patent Examiner.